

CLAIM AMENDMENTS

1 1. (currently amended) A method for hyperpolarizing
2 atomic nuclei through optical pumping in a test optical pumping
3 cell having an inlet and an outlet spaced therefrom, whereby
4 polarization of an electron spin of an optically pumpable species
5 in a mixture created by means of a laser light [[is]] being
6 transferred to the nuclear spin of an atom to be hyperpolarized,
7 characterized in that the method comprising the steps of:

8 feeding components of the mixture and/or for the
9 hyperpolarization of inert compounds are guided through the inlet
10 into the test optical pumping cell as a jet flow, drawing the
11 mixture out of the cell through the outlet such that the mixture
12 does not touches the inner walls of the test optical pumping cell
13 only immediately adjacent the outlet, and passing the mixture
14 further on outside the cell for enrichment.

1 2. (currently amended) The method according to claim 1
2 characterized in that wherein the mixture jet flow is inclined in
3 the direction of flow, especially at an acute [[45']] angle to
4 [[the]] side wall of the cell [[,]] when guided fed into the test
5 optical pumping cell.

3. (canceled)

1 4. (currently amended) The method according to claim 1,
2 ~~whereby a bypass flow consisting of further comprising the step of~~
3 ~~feeding~~ a compound for the separation of the mixture from
4 the inner walls is guided into the test optical pumping cell.

1 5. (currently amended) The method according to claim 1,
2 ~~characterized in that wherein~~ the laser light is radiated into the
3 test optical pumping cell perpendicular [[ly]] to the direction of
4 ~~jet flow of the mixture flowing in the test optical pumping~~ cell.

1 6. (currently amended) The method according to claim 1,
2 ~~characterized in that wherein~~ the laser light is radiated into the
3 test optical pumping cell [[in a]] countercurrent to the direction
4 of ~~jet flow of the mixture flowing in the test optical pumping~~
5 cell.

1 7. (currently amended) The method according to claim 1,
2 ~~characterized in that wherein~~ the mixture is disengaged at the
3 point where the intensity of the laser is largest.

1 8. (currently amended) The method according to claim 1,
2 ~~characterized in that further comprising the step of~~
3 ~~cooling the walls of the test optical pumping cell are~~
4 cooled.

1 9. (currently amended) The method according to claim 1,
2 characterized in that wherein the spin exchange is transferred
3 indirectly via a non-optically pumpable species to the nuclear spin
4 of a nucleus to be hyperpolarized.

1 10. (currently amended) The method according to claim 1
2 , whereby wherein ^{129}Xe , ^3He or $^{13}\text{CO}_2$ are hyperpolarized.

1 11. (currently amended) An apparatus for implementing
2 the method according to claim 1, characterized by the apparatus
3 comprising:

4 a cylindrical optical pumping cell having an inlet and an
5 outlet spaced therefrom;

6 a supply of at least one means for feeding into the test
7 cell the components of the a mixture [[out]] of optically pumpable
8 species and hyperpolarizable nuclei connected to the inlet of the
9 cell; and /or other compounds inert to hyperpolarization

10 nozzle means at an inlet of the optical pumping cell for
11 forming and injecting a jet flow of the mixture into the optical
12 pumping cell and for drawing it out through the outlet such that
13 the mixture does not touches the inner walls of the test optical
14 pumping cell only adjacent the outlet and for passing the mixture
15 from the outlet on for enrichment.

1 12. (currently amended) The apparatus according to
2 claim 11, characterized in that wherein the inlet [[and/]] or the
3 outlet forms a predetermined acute angle to the longitudinal axis
4 of the test optical pumping cell, in particular -45°.

13. (canceled)

1 14. (currently amended) The apparatus according to
2 claim 11, characterized in that wherein the means forms a free
3 column for injecting the mixture into the test optical pumping
4 cell.

1 15. (currently amended) The apparatus according to
2 claim 11, characterized in that wherein the means is a surrounding
3 stream for the mixture.

1 16. (currently amended) The apparatus according to
2 claim 11, characterized in that wherein at least one laser is set
3 such that the laser beam is oriented perpendicular and/or
4 countercurrent to the flow of the mixture in the test optical
5 pumping cell.

1 17. (currently amended) The apparatus according to
2 claim 11, characterized in that wherein the input window or windows
3 of the test optical pumping cell have for the laser beam the

4 greatest possible spacing from the input of the test optical
5 pumping cell for the optically pumpable species.

1 18. (currently amended) The apparatus according to
2 claim 11, characterized by the provision of further comprising:
3 _____ at least one supply container for a chemical species.

1 19. (currently amended) The apparatus according claim
2 11, characterized in that wherein the supply container is mounted
3 in the supply line(s) of the apparatus.

1 20. (currently amended) The apparatus according to
2 claim 11, characterized by further comprising:
3 means for cooling walls of the test optical pumping cell.

1 21. (new) The apparatus according to claim 11 wherein
2 the cylindrical cell is centered on an axis, the inlet opening into
3 the cell at the axis and the outlet opening radially into the cell
4 offset from the axis.